

REMARKS

In response to the first Office Action dated August 18, 2005, the Applicant hereby requests reconsideration of the pending claims in light of the following.

STATUS OF CLAIMS

Claims 1-20 as originally filed were pending.

Claims 1, 2, 3, 5, and 6 are amended.

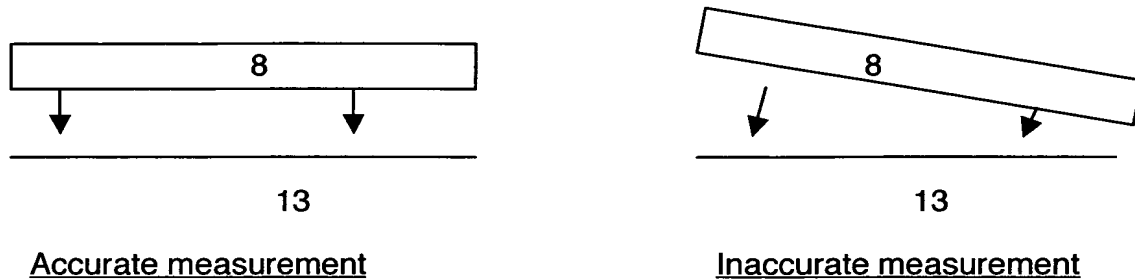
Accordingly, claims 1-20 are before the Examiner for consideration.

CLAIM REJECTIONS

Claim 1 was rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 4,833,630 to Braman et al. ("Braman"). Claim 1 has been amended, as set forth above, to further specify that the "first position measuring system" determines the spatial position of the second standard with respect to the first standard in three dimensions. With the inclusion of this limitation, claim 1 is believed allowable over Braman, since Braman fails to disclose such a feature. More particularly, as the Examiner is aware, for an anticipation rejection under 35 U.S.C. § 102(b), the prior art reference in question must disclose or suggest each and every element and limitation of the invention as recited in the claim. Here, Braman does not disclose a position measuring system for determining the 3-dimensional spatial position of a first standard with respect to a second standard, as now recited in claim 1.

To elaborate, an embodiment of the present invention, as shown in FIG. 1, includes a first position measuring system 10. The first measuring system 10 includes first and second reading heads 9 and 11 for determining an X-Y position of the second standard 24 with respect to the first standard 4. The first measuring system 10 further includes distance sensors 17, 18, 19 which operate to detect the distance and the angular position of the second standard 24 with respect to the main surface 13 of the first standard. See Section [0036]. In other words, "the distance sensors 17, 18, 19 detect their distance in the Z direction relative to the main surface 13 of the first standard." See Section [0048]. Thus, the first position measuring system 10 not only determines the spatial position of the second standard 24 with respect to the first standard 4 in two dimensions, but in three dimensions as well. The purpose of this function is to account for any irregularities in the device's components or the like that might cause, for example, angular offsets between the

components resulting in measurement errors. For example, if the base 8 of the second standard 24 happened to not be perfectly parallel to the surface 13 of the first standard 4 for some reason (e.g., manufacturing tolerances, environmental conditions, or the like), as shown in the sketch below on the right, this might cause a measurement error if only the reading heads 9 and 11 were utilized to detect the X-Y position.



However, having the distance sensors 17, 18, 19 allows the device to determine any 3-dimensional angular offset for compensating for any such irregularities, because these sensors sense the "Z" distance between the base 8 and surface 13. Reference is also made to Section [0009], which discusses this feature in more detail ("therefore, it is not necessary to perform path corrections by way of calculation for any defects occurring, such as straightness defects, length defects and tilt defects of three linear coordinate axes arranged at right angles to each other.")

In Braman, on the other hand, the position measuring system therein includes two sensors 10, 20 that only determine the 2-dimension, X-Y position of the slide 5 with respect to the table 1. There is no teaching or suggestion of a measuring system that determines a three-dimensional spatial position of a first standard with respect to a second standard, e.g., that also determines a Z dimension or position. In particular, the points P1 and P2 in Braman define a line (see FIG. 1 in Braman) that is meant to be parallel to the table 1. See Col. 3, lines 60-66. If this line, and in particular the plane of the rest base 4, happens to not be parallel to the plane of the table 1, this cannot be detected by the device in Braman, resulting in possible measurement errors.

Because Braman fails to disclose a position measuring system for determining the 3-dimensional spatial position of a first standard with respect to a second

standard, as now recited in claim 1, it cannot anticipate claim 1 under 35 U.S.C. § 102(b). Accordingly, claim 1 is believed allowable.

Claims 3 and 4 were also rejected under 35 U.S.C. § 102(b) as being anticipated by Braman. Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Braman in view of German Application no. DE4132942A1 to Kober. In light of the amendments to claim 1, claims 2-4 are believed allowable as depending from an allowable base claim.

Although claim 1 is allowable, as discussed above, claim 5 has been rewritten into independent form to pose a separate issue from claim 1.

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Braman. The Examiner notes that Braman does not disclose three triangularly arranged sensors, as specified in claim 5, but goes on to contend that "it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide at least three distance sensors arranged in the corners of an imaginary equilateral triangle, since it has been held that the mere duplication of the essential working parts of a device involves only routine skill in the art." The Applicant respectfully traverses this rejection, it being contended that: (i) the three sensors as recited perform a function other than that of the sensors in Braman, i.e., the sensors in Braman are not "distance" sensors; (ii) having three sensors, as opposed to two, is not merely the duplication of essential working parts; and/or (iii) in light of the manner in which Braman works, there would have been no reason or motivation for one skilled in the art to add another sensor triangularly arranged.

To elaborate, the purpose of the distance sensors 17, 18, 19, as described above in regards to claim 1, is for determining the "Z" distance between the first and second standards. In Braman, the sensors 10, 20 are for purposes of determining the X-Y position in relating to the line grid 2 used in Braman. In other words, the sensors 10, 20 interact with specific lines y1, y2, y3/x1, x2, x3, etc. of the line grid 2 for determining the X-Y position of the base 4. As such, the sensors 10, 20 are not configured for measuring the distance between anything and, as such, cannot reasonably be characterized as "distance" sensors.

Moreover, even if the sensors 10, 20 in Braman could be considered as "distance" sensors, the three distance sensors 17, 18, 19 in the present invention are

not provided merely for duplicative functions. Instead, three distance sensors, triangularly arranged, are required for determining the angular, 3-dimensional orientation of the second standard with respect to the first. If two distance sensors

were used, for example, it would not be possible to fully determine the angular orientation of the second standard. Put another way, two distance sensors would determine the angular orientation of a line in the plane of the second standard's base, whereas three non-linear sensors (points) are required for defining the plane. (This comports with standard geometry, where two points define a line but three non-linear points are required to define a plane.) Accordingly, the use of three distance sensors cannot be considered merely the duplication of working parts, in regards to two sensors, where the three sensors operate in, and are provided for purposes of, a completely different function than the two sensors.

Finally, the device in Braman functions in a manner that relies on the two sensors 10, 20 being linearly arranged with respect to a translation point P' of the probe 7: "the rest base of the mobile frame comprises two reference means defining two points of a line parallel to the table, these two points being consequently in invariable positions in relation with the orthogonal projection of the reference center of the spherical contact of the probe on the table's plane..." Col. 3, lines 60-69 (emphasis added). Reference is also made to Braman at Col. 6, lines 23-33:

the computing of the abscissa x and ordinate y is realized in the array type plane sensing system, from the detected position of the two feeling points P1 and P2 materialized by the reference means 10 and 20 of the saddle 4, from the known relative position of the orthogonal projection or mark P' of the center P of the feeler-spindle spherical contact 7 in relation with these two points, position defined in this case by the distance L, already mentioned, and finally from the diameter D of the spherical contact...

As should be appreciated, because the device in Braman uses this linear arrangement of the sensors 10, 20 in line with the projection P' of the probe 7, adding another sensor would serve no purpose whatsoever. Accordingly, within the context of the teachings in Braman, one skilled in the art would not have been motivated to add a triangularly arranged third sensor to the device in Braman.

In light of the above, it is respectfully submitted that under Braman it would not have been obvious to a person of ordinary skill in the art at the time the present invention was made to provide at least three distance sensors arranged in the

corners of an imaginary equilateral triangle. Accordingly, claim 5 is believed allowable over the 35 U.S.C. § 103 rejection.

ALLOWABLE SUBJECT MATTER


Claims 6-20 were deemed allowable if rewritten into independent form. Claim 6 has been rewritten into independent form, to include the relevant limitations of claim 1. As such, claim 6 is believed allowable. Claims 7-20 depend from claim 6 and, as such, are likewise believed allowable.

CONCLUSION

In view of the foregoing, it is respectfully submitted that pending claims 1-20 are in condition for allowance and action to that effect is earnestly solicited.

No fees are believed due for the present Response. However, authorization is hereby given to charge any fees owed to our Deposit account No. 13-0235.

Respectfully submitted,

By 
John A. Kramer
Registration No: 46,302
Attorney for Applicants

McCORMICK, PAULDING & HUBER LLP
CityPlace II
185 Asylum Street
Hartford, CT 06103-3402
(860) 549-5290